CLASS- XII

Holiday Homework- Autumn Break

Physics

1. Search about the largest telescope in the world. Why a telescope is made so huge?
2. Objective of a microscope is small and eyepiece is large in aperture while objective of a telescope is large and eyepiece is small. So, can we use a microscope as a telescope from opposite side? Explain your answer.
3. Write a short note about a Cassegrain telescope. How is it better than refracting telescope.

Chemistry

A. DESCENT IN HALOALKANE SERIES.

i) Convert chloroethane into chlorobutane

ii) Convert chloropropane into chlorobutane

B. ASCENT IN HALOALKANE SERIE

Convert chloropropane into chloroethane.

NOTE: USE ASCENDING AND DESCENDING SERIES CONVERSION TRICK SEND IN WATSAPPP GROUP.

Biology

1. Collect the Information about RT-PCR technique being used to detect COVID-19, Write the findings as under:
   a. Principle Involved
   b. Methodology
   c. Reliability of the test
2. Observe the various types of Population interactions in your immediate surroundings and write one example of each.

S.No.	Name of Interaction	Species A	Species B	Comment

Mathematics

INSTRUCTIONS :

** Use Ruler, Pencil, Compass and Protractor for constructions.

** Do all the work on a notebook of 20 pages.

1. Show that the function f(x) = $4x^3 - 18x^2 - 27x - 7$ is always increasing in R

2. If $\frac{d}{dx}$ (f(x)) = $4x^3 - \frac{3}{x^4}$ such that f(2) = 0 .Then f(x) is:

(a) $x^4 + \frac{1}{x^3} - \frac{129}{8}$ (b) $x^3 + \frac{1}{x^4} + \frac{129}{8}$ (c) $x^4 + \frac{1}{x^3} + \frac{129}{8}$ (d) $x^3 + \frac{1}{x^4} - \frac{129}{8}$

3. Evaluate $\int \frac{dx}{\sin^2 x \cos^2 x}$.

4. Evaluate $\int \frac{dx}{1+\tan x}$

5. If x= a(2θ - sin2θ), y = a(1- cos2θ), find $\frac{dy}{dx}$ at $\theta = \frac{\pi}{3}$

6. For what value of x, $\begin{bmatrix}1 & 2 & 1\end{bmatrix}\begin{bmatrix}1 & 2 & 0\\ 2 & 0 & 1\\ 1 & 0 & 2\end{bmatrix}\begin{bmatrix}0\\ 2\\ x\end{bmatrix} = 0$.

7. Prove that $\tan^{-1}\frac{2}{11} + \tan^{-1}\frac{7}{24} = \tan^{-1}\frac{1}{2}$

8. Let Z be set of all integers and R be the relation on z defined as
R= {(a,b): a,b$\in Z$ and $a-b$ is $divisible$ by 5}. Prove that R is equivalence relation.

9. Solve the equation $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$

10. Write in the simplest form $\tan^{-1}\left[\frac{a\cos x - b\sin x}{b\cos x + a\sin x}\right]$

11. Find $\frac{dy}{dx}$ when $y = x^{\log x} + (\log x)^x$

12. Differentiate $\tan^{-1}\left[\frac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right]$ with respect to x.

13. Prove that the curves $x = y^2$ and $xy = k$ cut at right angles if $8k^2 = 1$.

14. Prove that $\begin{vmatrix}a+b+2c & a & b\\ c & b+c+2a & b\\ c & a & c+a+2a\end{vmatrix} = 2(a+b+c)^3$.

15. If x,y,z are different and $\begin{vmatrix}x & x^2 & 1+x^3\\ y & y^2 & 1+y^3\\ z & z^2 & 1+z^3\end{vmatrix} = 0$,show that

(i) 1+xyz = 0

(ii) xyz = -1

16. Integrate $\int e^x\left(\frac{x^2+1}{(x+1)^2}\right) dx$'

17. Find the value of p and q such that function f(x) = $\begin{cases}\frac{1-\sin^3 x}{3\cos^2 x}, & if\ x < \frac{\pi}{2}\\ p, & if\ x = \frac{\pi}{2}\\ \frac{q(1-\sin x)}{(\pi-2x)^2}, & if\ x > \frac{\pi}{2}\end{cases}$

Is continuous at x = $\frac{\pi}{2}$.

18. Evaluate $\int_0^{\frac{\pi}{2}} (2\log\sin x - \log\sin 2x)\, dx$

19. **Evaluate** $\int \sqrt{\cot x} + \sqrt{\tan x}dx$

20. An open box with a square base is to be made out of a given quantity of cardboard of area c^2 . Show that the maximum volume of the box is $\frac{c^3}{6\sqrt{3}}$

21. Prove that the volume of the largest cone that can be inscribed in a sphere of radius R is 8/27 of the volume of sphere.

22. Find A^{-1} **where A =** $\begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$ **hence solve the system of equation**

$$x + 2y - 3z = -4;$$
$$2x + 3y + 2z = 2;$$
$$3x - 3y - 4z = 11.$$

Autumn Holiday Homework

Subject- Computer Science

Class- XII

Q: Write an interactive file program to create a simple library management software.

Modules of the program are:

1. Adding books details

2. Display the book details

3. Delete any record

4. Update record of books

5. Issue of books with details and keep the record in separate file.